REMARKS

Reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

Claims 1-12 and 14-23 are pending. Claim 13 has been cancelled and new claim 23 has been added to depend from claim 1.

Claim 1 has been amended to clarify that the ultrasonic wave energy directed to the road surface is sufficient to disrupt the surface tension of water on the road surface. Support for this amendment is found in the specification at page 5, lines 15-18.

New claim 23 recites that the wave energy is sufficient to heat the tire tread. Support for this claim is also found at page 5, lines 15 to 18.

Claim 2 has been amended to incorporate subject matter from cancelled claim 13 that the wave energy is directed to immediately in front of a tire.

Claim 14 has been amended to recite that the ultra-sonic wave energy is sufficient to remove water from the tire tread. Support for this amendment is found at page 5, lines 15-16.

Claim 16 has been amended to clarify that the ultra-sonic wave directed to the proximity of the tire has sufficient intensity to change the traction characteristics of the road surface or tire tread. Support for this amendment is found at page 5, lines 11-18, which describes using ultra-sound waves to improve traction by disrupting surface tension in water on the road surface, removing residual water from the tire tread, and, alternatively, heating the tire tread surface.

Claims 4 and 22 have been amended to correct spelling errors. Claim 7 has been amended for clarity.

The invention as defined in independent claims 1 and 16 is a system and method for monitoring road traction conditions by way of a vehicle's operating parameters, and when a road traction conditions deteriorate, activating traction improvement including directing ultra-sound wave energy at a proximity of the tire in sufficient intensity to cause an improvement in traction. By claim 1, this is done by disrupting the surface tension in water on the road surface. Claim 16

recites using the ultra-sound wave to change the traction characteristics of the road surface or tire tread.

Claim 1 was rejected under 35 USC §102(b) as being anticipated by US Patent No. 4,678,056 to Kobari et al. The Kobari patent discloses a system for monitoring road surface conditions using an ultra-sound wave generator. The Kobari system looks at the hardness of the road surface to detect mud or snow. Information from the road condition sensors is used to activate the vehicle's four wheel drive when road conditions are appropriate to do so. The ultra-sound waves, themselves, are not used to improve traction. There is neither the disclosure nor the suggestion that the ultra-sound device does anything more than monitor the road condition, or that the intensity of the waves is any more than is required for monitoring the surface.

Claims 1 and 16, by contrast, recite using ultra-sound waves to, respectively, disrupt water surface tension and change the traction characteristics of the road surface. Claims 1 and 16 are for at least these reasons allowable over the cited art.

Claim 2 recites the ultra-sound wave energy directed to a road surface immediately in front of a tire. The Kobari patent discloses the sensors are being positioned on a rear vehicle bumper along a tire track. Column 4, lines 26-43, and more specifically at lines 29-35. Note that the referenced Figures 3 and 4 show the sensor device on the rear bumper. This is asserted to be helpful in detecting mud conditions that might be disguised by a surface crust on the mud. Claim 2 depends from allowable base claim 1 and is allowable for that reason and for the reason given above.

Claim 12 was rejected under 35 USC § 103(a) as being unpatentable over the Kobari patent. Claim 12 depends from claim 1 and is allowable as depending from an allowable base claim. Further, Kobari discloses a sensor that is installed on a vehicle to sense road conditions. There is no suggestion or motivation to include more than one sensor on the vehicle. Such redundancy would not improve the sensing capability as the vehicle tires all run on the same road surface. Further, modifying Kobari to include multiple wave guides to sense the

road condition at each tire does not result in the claimed invention, as the wave energy disclosed by Kobari is for sensing, not disrupting surface tension in road surface water.

Claim 12 is allowable for this additional reason.

Claims 3-7, 10 and 13-22 were rejected under 35 USC § 103(a) as being unpatentable over the Kobari patent in view of US Patent No. 5,350,035 to Bodier et al.

The Kobari patent discloses monitoring road conditions for deciding when to switch between two-wheel drive and four-wheel drive, but does not disclose a system for improving traction using ultrasonic waves. The Kobari system uses ultrasonic waves to measure the hardness of the road surface to detect, for example, snow or mud conditions. The Bodier patent discloses a system that monitors the vehicle for hydroplaning, and uses a compressed air jet, a jet of liquid, or a jet of particles to break up the water layer in front of the tires. Column 4, lines 10-19.

There is no suggestion to combine Kobari and Bodier because they perform disparate functions. Kobari does not mention nor is it concerned with hydroplaning. Hydroplaning is a function of tire pressure and vehicle speed. Four wheel drive operation will not prevent or aid hydroplaning, as whether the tires are driven or not driven is not a factor in hydroplaning. Bodier, on the other hand, is concerned with a system for taking action when hydroplaning is detected. None of the actions (e.g., spraying an air jet in front of a tire) are useful, therefore, to determining whether to change from two-wheel drive to four-wheel drive. Modifying Kobari to include an anti-hydroplaning function as disclosed by Bodier is a product of impermissible hindsight reasoning.

Further, neither Kobari nor Bodier discloses or suggests using ultrasonic waves to disrupt surface tension in water or to improve the traction characteristics of the road or tire surface. Kobari uses ultrasonic waves to measure road surface hardness. Where Bodier does disclose using ultrasonic waves, it is to detect the shape of the tire at the contact patch as a way of determining whether the tire was experiencing hydroplaning. Column 2, lines 29-

34 and column 3, lines 34-41. The combination of Kobari and Bodier does not disclose or suggest a system or method using ultrasonic waves to improve traction.

Claims 3-7, 10, and 13-22 are allowable for at least these reasons.

In addition, in relation to claim 14 and claim 23, the Bodier patent discloses an anti-hydroplaning device for a vehicle that detects hydroplaning by a sensor that senses the wheel curvature of the tire in the contact area. This sensor is disclosed to be an optical sensor, a laser, a radar device, or an ultrasonic device. Column 3, lines 34-41. By contrast, claim 14 recites directing ultrasonic wave energy at the tire tread to remove water from the tread, and claim 23 recites directing ultrasonic waves at the tread to heat the tread. Neither is disclosed or suggested by the Bodier patent. Claims 14 and 23 are allowable for this additional reason.

Claims 8-9 and 11 were rejected under 35 USC §103(a) as being unpatentable over the Kobari and Bodier patents in further view of US Patent No. 5,100,175 to Swallow et al. Claims 8-9 and 11 depend from an allowable base claim and are allowable for at least the same reasons.

For the foregoing reasons, applicant respectfully submits that claims 1-12 and 14-23 are allowable. Favorable action is requested.

The Examiner is invited to telephone the undersigned if there are questions about this paper or to resolve any outstanding issues.

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